Dairy and Livestock **PUBLICATION**

Using Solar Energy to Pump Water for Livestock in Remote Areas

Energy Management Series
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About this publication:

The Solar Project is a cooperative effort of the:

California Energy Commission
University of California Cooperative Extension
Snedden Ranch
Bar Mt. Ranch
Shield F. Ranch
San Bernardino County Range Improvement Committee
Kern County Section 15 Grazing Advisory Committee

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The Bar Mountain Solar System

Uneven use of range land by livestock is an environmental problem. In most cases, we can improve range condition without reducing stocking rates by more uniform range utilization. On most ranges poor water distribution is the leading cause of poor livestock distribution, resulting in uneven range utilization. When watering sites are infrequent, large sacrifice areas around water sites often occur (Holechek, et al. 1989).

Studies have shown up to 100% use of forage around water sites with use dropping off rapidly as distance from the water site increases (Holscher and Woolfolk 1953, Mueggler 1965, Valentine 1947, Beck 1978).

In addition, long distances traveled to water can use energy needed for weight gain and milk production, time needed for grazing and rest, as well as increasing the number of trails which may increase the erosion potential (Holechek et al. 1989).

Recommended distances between water sites vary according to the terrain, breed, and type of animal; varying from 0.5 miles in rough country to 2.0 miles in flat country (Barnes 1914; Holechek, et al. 1989). Water pumping and distribution systems could improve range utilization and livestock performance on much of California range lands.

Numerous small water sites planned for approximately 50 cattle or 300 sheep (Holechek, et al. 1989) properly spaced will improve range condition and utilization and increase livestock performance. Large expensive traditional systems and related operating expenses often make water development cost ineffective and impractical. Recent technological advances make solar pumping systems cost effective alternatives.

Historically, the Bar Mountain Ranch used gasoline engines and generators to pump water where grid power was not available. Early in 1989, the ranch approached the University of California Cooperative Extension in Kern County requesting information on the use of solar energy (photovoltaic) for pumping livestock water. The ranch had excellent cost records for pumping water using gasoline engines and generators. Ranch management was sure that solar power could pay for itself in two to three years and wanted to design a project to compare traditional pumping with solar pumping.

Bar Mountain Ranch and Cooperative Extension entered into a cooperative project demonstrating the use of solar power for pumping water. The ranch supplied all of the equipment capital and labor for the project. The California Energy Commission has provided used solar panels and some capital for supplies. Cooperative Extension, Kern County, has coordinated information between the ranch and several solar equipment manufacturers. The Kern County Farm Advisor has cooperated with the ranch in collecting data and extending the information to interested parties.

ORDERING INFORMATION:

Copies of the publication that includes cost analysis can be ordered from:

California Energy Commission
Energy in Agriculture Program
1516 Ninth Street, MS-26
Sacramento, California 95814
(916) 654-4019